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Miner理论的统计特性分析

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STATISTICAL PROPERTY ANALYSIS OF MINER CUMULATIVE DAMAGE

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摘要

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摘要 分析了 Miner瞬时累积损伤 D_i 分散性的来源,提出了一个解决原始 Miner累积损伤理论的两个主要缺陷的方法。理论分析和 Monte-Carlo数值模拟结果表明:Miner瞬时累积损伤 D_i 可用对数正态分布加以描述

关键词: Miner理论 随机载荷 内在分布 外在分布 Monte-Carlo数值模拟

Abstract: There are two main shortcomings with the Miner cumulative damage theory. One is its linear cumulation of fatigue damage that the cumulative damage changes owing to loading series cannot be taken into account, and the other is its indeterminacy that the scatters caused by external scatter of loading and the inherent scatter of materials cannot be included. In this paper, the sources of scatters of Miner cumulative damage D_i are discussed, and then an analytical method which attempts to overcome the two shortcomings is presented. Theoretical analysis and Monte Carlo numerical calculation show that Miner cumulative damage D_i can be described by lognormal distribution.

Keywords: Miner theory stochastic loading internal distribution external distribution MonteCarlo simulation.

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